236. Proposed by L. SHIVELY, Mt. Morris College, Mt. Morris, Ill.

Sum to infinity the series $\dfrac{n^2}{(n+1)!}$ beginning with $n=1$.

GEOMETRY.

257. Proposed by G. I. HOPKINS, A. M., Manchester, N. H.

Construire un triangle équilatéral sachant qu'el doit s'appuyer par ses trois sommets sur trois circonférences concentriques données.   *Rouché et Comberousse.*

258. Proposed by B. F. FINKEL, A. M., Professor of Mathematics, Drury College, Springfield, Mo.

Prove that the tangents to an ellipse from any external point subtend equal angles at the focus, by means of the formula $\tan \phi = (m_1 - m_2) / (1 + m_1 m_2)$, where ϕ is the angle between the focal radius of either of the points of tangency and the line joining the focus and the external point, and m_1 and m_2 are the slopes of these two lines.

259. Proposed by R. D. CARMICHAEL, Hartselle, Ala.

Given three non-intersecting circles; to draw eight tangent circles, each tangent to all three of the given circles.

CALCULUS.

196. Proposed by F. P. MATZ, Sc. D., Ph. D., Reading, Pa.

The shortest tangent intercepted by the axes of the ellipse to which the tangent is drawn, equals the sum of the semi-axes of the ellipse.

197. Proposed by R. D. CARMICHAEL, Hartselle, Ala.

$$\int_0^\infty \frac{\sin mx \, \cos nx}{x} dx.$$

189. Proposed by M. E. GRABER, A. M., Heidelburg University, Tiffin, O.

Show that $e \displaystyle\int_1^\infty,\ \epsilon^2 \displaystyle\int_2^\infty,\ \text{.........} \epsilon^n \displaystyle\int_n^\infty,\ \text{.........}$ are integers divisible by $(p+1)!$, when

the expression under the integral is $Z^p \Big[(z-1) \text{.................} (z-n) \Big]^{p+1} e^{-z} \, dZ$.

MECHANICS.

178. Proposed by F. ANDEREGG, A. M., Professor of Mathematics, Oberlin College, Oberlin, O.

A weight W is drawn up a rough conical hill of height h and slope a. and

the path cuts all the lines of greatest slope at the constant angle β. Find the work done in attaining the summit.

[Problem 11, page 226, *Johnson's Theoritical Mechanies.*]

179. Proposed by F. P. MATZ, Sc. D., Ph. D., Reading, Pa.

If the *velocity* of a body moving under an acceleration tending to the center *varies* as the radius of curvature, the body will describe a cycloid.

MISCELLANEOUS.

148. Proposed by F. P. MATZ, Ph. D., Sc. D., Reading, Pa.

Given $\sin 3\phi + \cos 3\phi = m$............(1), and $\cos\phi - \sin\phi = x$..............(2), to find x extremes of m.

AVERAGE AND PROBABILITY.

163. Proposed by R. D. CARMICHAEL, Hartselle. Ala.

In a regular n-gon a triangle is formed by taking three vertices at random. What is the mean value of the triangle.

164. Proposed by J. O. Mahoney. B. E., M. Sc., Central High School, Dallas. Texas.

If m is prime, and the numbers 0, 1, 2, 3,..................., $m^2 - 1$ are placed at random in the form of a square, the probability that the square is *hyper-magic* is

$$\frac{(m-1)\,m}{(m^2-2)\,!}$$

NOTE.—Problems and solutions in the departments of Geometry, Calculus, Mechanics, and Average and Probability should be sent to B. F. Finkel; and those in the departments of Algebra, Diophantine Analysis, Miscellaneous, and Group Theory should be sent to Dr. Saul Epsteen. Our contributors should carefully observe this notice if proper credit for contributions is to be given.

NOTES.

The Chicago Section of the American Mathematical Society met in Chicago on April 29.   E.

Mr. Newton Ensign, of McKendree College, a student of our well known contributor Prof. G. W. Greenwood, was awarded the Rhodes Scholarship for Illinois. He will pursue the honor mathematical course at Oxford University. E.

The Open Court Publishing Co., of Chicago, has just issued a portfolio of twelve portraits of eminent mathematicians, edited by Professor David Eugene Smith. It includes the portraits of DeCartes, Pythagoras, Archimedes, Fermat,